Initial Investigation of preclinical integrated SPECT and MR imaging.

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Public Summary:
Single-photon emission computed tomography (SPECT) can provide specific functional information while magnetic resonance imaging (MRI) can provide high-spatial resolution anatomical information as well as complementary functional information. In this study, we utilized a dual modality SPECT/MRI (MRSPECT) system to investigate the integration of SPECT and MRI for improved image accuracy. The MRSPECT system consisted of a cadmium-zinc-telluride (CZT) nuclear radiation detector interfaced with a specialized radiofrequency (RF) coil that was placed within a whole-body 4 T MRI system. The importance of proper corrections for non-uniform detector sensitivity and Lorentz force effects was demonstrated. MRI data were utilized for attenuation correction (AC) of the nuclear projection data and optimized Wiener filtering of the SPECT reconstruction for improved image accuracy. Finally, simultaneous dual-imaging of a nude mouse was performed to demonstrated the utility of co-registration for accurate localization of a radioactive source.

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